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ABSTRACT

This study seeks to determine what differences in readiness existed in Louisville, Kentucky children who had been exposed to various combinations of Head Start, Follow-Through and regular kindergarten. All first grade children in Louisville were tested with the Metropolitan Readiness Test during the first month of first grade. Data was analyzed with analysis of covariance, analysis of variance and correlation. Although additional data analysis is in process, five tentative conclusions are offered: (1) the token-economy Follow-Through kindergarten was better for these children than the regular kindergarten; (2) the best combination of Head Start and kindergarten was traditional Head Start followed by Follow-Through kindergarten; (3) the worst combination was Bereiter-Engelmann Head Start followed by regular kindergarten; (4) for children entering the Follow-Through program in kindergarten there is no evidence that there was an advantage in having had Head Start at all; and (5) for males entering the regular kindergarten program, any type of Head Start appeared to be better than none. (WY)

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"EXPERIMENTAL VARIATION OF HEAD START CURRICULA: A COMPARISON OF CURRENT APPROACHES"

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PROGRESS REPORT No. 9

March 1, 1971 - May 31, 1971

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INTRODUCTION

This report covers the period from March 1, 1971 to May 31, 1971. Results are reported on the Metropolitan Readiness Test administered to the children by their teachers during the first month of first-grade. The following analyses were made on total and subtests scores:

1. Covariance analysis using end-of-Head Start scores on a correlated measure as the covariate: Kindergarten effects, sex effects, Head Start program effects, and interactions.

2. Analysis of variance comparing Follow-Through and Regular Kindergarten Control children who had not had any Head Start: Kindergarten and sex effects.

3. Matched classes analysis of variance: Head Start/Kindergarten combination effects.

4. Analysis of variance of original subjects: Head Start program effects.

5. Correlations between Metropolitan Readiness Test and other cognitive variables.

Data reduction and analyses are presently in process on the following activities which were completed June 1:

1. Main battery given to experimental and control children at the end of first grade.

2. Main battery given to middle-class contrast group at the end of Kindergarten.

3. Video-taping in first grade classes.

4. Video-taping in middle-class kindergartens.

All work has been completed on the film report of the first year of the study except for editing which is currently in process.

Work is progressing on the final report.

The Metropolitan Readiness Test was administered to all first-grade children in the City schools by their teachers during the first month of first-grade. Individual total and sub-test scores on the experimental and control children were obtained from the City school system.

The selection of the most appropriate analysis of the scores on this test presented special problems. It was desirable to make comparisons between Follow-Through and Regular Kindergarten, as well as among the four Head Start programs which the children attended in the pre-kindergarten year, and to determine whether differences in performance existed for various combinations of Head Start and Kindergarten. Both the covariation of Head Start with Kindergarten and the interaction between Head Start and Kindergarten were of interest as well as the combination of these two, within and among programs. By covariation is meant the following: Assuming that different Head Start programs may have produced different levels of readiness as well as other differences in the children prior to Kindergarten, what were the combined effects of these different Head Start programs with the two types of Kindergarten experiences? By interaction is meant the following: Similar pre-kindergarten levels of readiness produced by different Head Start programs might be affected differently by the two Kindergarten experiences - that is, even though two classes, one in Traditional and one in DARCEE, for example, had theoretically started Kindergarten at the same level of readiness, a difference in final level could result because of residual effects of Head Start programs in other variables, such as attitudes or habits. These effects might interact with Kindergarten programs as a result of greater or less similarity between Head Start and Kindergarten teaching methods, classroom ecology, pace, etc.

A number of sources of variation contributed to the Readiness scores. These are classified into two groups: (A) sources which constitute error variance for any comparison of interest, and (B) those which are of interest in themselves, but which may constitute sources of error for other comparisons of interest. These are discussed as follows:

(A) Error

(1) Kindergarten Teachers: Children from the original Head Start programs were distributed into a number of classes in both Follow-Through and Regular Kindergarten. Therefore, the confounding of program with teacher did not exist except in the case of Montessori. There were only two Montessori classes originally. One of these classes entered Follow-Through and children from this class were distributed into four Follow-Through classes. However, since the other Montessori class was in the same school where a continuation class in Bereiter-Engelmann was arranged, all of these Montessori children had the same Regular Kindergarten teacher. This source of variation was, therefore, considered randomized for all programs except Montessori.

(2) Pre-Kindergarten Individual Level on Readiness: The assignment of children to Follow-Through or Regular Kindergarten was not random but was determined by the Head Start class and area. All classes

from Area #4 went into Follow-Through - one from each Head Start program. No previous scores on Readiness were available, of course. Therefore control for this source of variation could only be obtained by using end-of-Head Start scores on a measure correlated with Readiness.

(3) Pre-Kindergarten Head Start Program Differences: This variable could be assessed by the use of end-of-Head Start program main effects on a correlated measure.

(4) Pre-Kindergarten Follow-Through - Regular Differences: Since all classes in Area #4 entered Follow-Through, this variable could be assessed by using end-of-Head Start area main effects on a correlated variable.

(5) Interactions Between Pre-Kindergarten Head Start Program Level and Pre-Kindergarten Level in Follow-Through vs. Regular: Since one class from each Head Start program in Area #4 entered Follow-Through, this source of variance could be assessed by the use of end-of-Head Start program-by-area interaction on a correlated measure.

(B) Variables of Interest

(6) Main Effect of Kindergarten Program: In order to compare the main effect of the two Kindergarten programs, it was necessary to adjust as nearly as possible for individual differences on a pre-kindergarten level and for pre-kindergarten Head Start program differences. This could only be done on a correlated measure.

(7) Interaction of Kindergarten with residual Head Start Program Effects during the Kindergarten Year: In order to assess different Kindergarten effects across Head Start programs at the same pre-kindergarten level, it was necessary to adjust as in (6) for pre-kindergarten individual and Head Start program differences.

(8) Main Effect of Head Start Program as a residual beyond level of success produced in the pre-kindergarten year: This required adjustment similar to (6).

(9) Sex Main Effects and Interactions of sex with residual Head Start and Kindergarten Effects: This required adjustment similar to (6).

(10) Covariation of Kindergarten and Previous Head Start Programs in the Kindergarten Year: This is the effect of various combinations of Head Start and Kindergarten programs, including pre-kindergarten level produced by the different Head Start programs. Ideally the design would have permitted assignment of more than one class from each program to each type of Kindergarten. This was the case in Regular Kindergarten but there was only one class from each Head Start program in Follow-Through, thus completely confounding Head Start teacher and pre-kindergarten level with Head Start program. Given this limitation in design, there is no completely satisfactory procedure for assessing combined Head Start/ Kindergarten effects. It might be possible to adjust for Follow-Through

vs. Regular Kindergarten differences, interaction of this with pre-kindergarten Head Start program level, and pre-kindergarten individual differences within Head Start programs - all without removing pre-kindergarten differences among Head Start programs. However, there is no way to remove the confounding of Head Start teacher and Head Start program in Follow-Through by statistical methods.

(11) Covariation of Sex with Head Start and Kindergarten Combinations: Required adjustment similar to (10).

(12) Main Effect of Head Start including pre-kindergarten level but excluding type of Kindergarten: This required removal of Kindergarten main effect and interaction of Head Start and Kindergarten.

Results

I. Covariance Analysis

For obtaining information on variables #6, 7, 8, and 9, the method of choice was a covariance analysis using end-of-Head Start scores on a correlated measure as the covariate. The test which appeared to assess skills most similar to those tapped by the Metropolitan Readiness Test was the Preschool Inventory. Correlation between the PSI at the end of Head Start and total Readiness score was .56. Moreover, a covariance analysis on the PSI itself using end-of-Head Start scores as the covariate had indicated a significant effect of Follow-Through on this measure, which further supported its selection as an appropriate variable for adjustment of Readiness scores. From this analysis, both Head Start main effects and interactions involving Head Start programs with other variables should be interpreted, not in terms of competency produced by Head Start/Kindergarten combinations, but rather as representing the effects of different sequences of teaching style, etc. (in other words, the residual effect of different Head Start programs combined with these two Kindergarten programs), apart from the success of the Head Start program originally. One exception may be noted: in cases in which adjustment of Readiness scores by covariance analysis did not change the ordering of Head Start program means in either Follow-Through or Regular Kindergarten, it seems reasonable to infer that the covariance procedure merely provided a more precise test by removing individual variation without eliminating Head Start program differences. In such cases, both Head Start main effects and interactions could be interpreted as the combined effects of Head Start and Kindergarten. N for this analysis was 140.

Follow-Through vs. Regular Kindergarten Main Effects

As Table 1 shows, total Readiness means collapsed over sex for all groups were higher in Follow-Through than in Regular Kindergarten. The covariance analysis also supports significant Follow-Through superiority on all six sub-tests. Table 1 shows that within each Head Start program superiority of Follow-Through over Regular is consistently the case for 22 out of the possible 24 sub-test comparisons.

Sex Effects and Interactions

Interactions of sex with other variables were found on both total scores and several sub-tests on the covariance analysis. On total score there was a Kindergarten-by-Head Start-by-Sex interaction which is best explained by saying that in Follow-Through, Bereiter-Engelmann females were higher than males, but in Regular, Bereiter-Engelmann males were higher than females; whereas DARCEE males did better in Follow-Through than in Regular and DARCEE females did better in Regular Kindergarten than males. Males in Montessori scored higher than females in both Kindergartens and there was no difference between the sexes from Traditional in either Kindergarten. On the Listening and Numbers sub-tests also, Bereiter-Engelmann females did better in Follow-Through and males better in Regular. This interaction on total score is shown in Figure 1.

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TABLE 1

Metropolitan Readiness Test Scores

Means Adjusted for End-of-Head Start Preschool Inventory

		Bereiter-Engelmann		DARCEE		Montessori		Traditional	
		F-T	Reg.	F-T	Reg.	F-T	Reg.	F-T	Reg.
Word Meaning	M	7.31	6.84	8.52	6.70	6.81	8.08	10.26	6.06
	F	7.23	5.27	7.36	8.00	6.28	7.32	11.54	6.41
	All Ss	7.26	5.77	8.04	7.30	6.57	7.76	11.00	6.28
Listening	M	7.35	8.77	10.21	9.61	9.77	9.63	12.89	8.95
	F	10.94	6.56	8.53	9.14	7.88	8.72	12.10	9.22
	All Ss	9.56	7.26	9.51	9.40	8.91	9.25	12.43	9.12
Matching	M	9.14	4.64	8.85	5.07	9.53	5.62	9.60	5.90
	F	8.66	3.95	8.49	6.25	6.50	3.84	8.77	6.14
	All Ss	8.84	4.17	8.70	5.61	8.15	4.87	9.11	6.05
Alphabet	M	9.72	6.34	10.04	5.18	13.77	8.89	13.13	7.29
	F	11.30	4.57	7.79	6.66	12.59	10.47	14.30	8.58
	All Ss	10.70	5.14	9.10	5.86	13.23	9.55	13.82	8.09
Numbers	M	8.81	9.78	14.17	8.91	14.25	11.98	13.55	9.83
	F	13.25	6.94	11.66	10.23	15.45	11.14	14.11	9.23
	All Ss	11.54	7.85	13.12	9.51	14.80	11.63	13.87	9.46
Copying	M	6.71	4.62	9.26	4.62	7.00	5.17	7.23	6.61
	F	7.06	3.76	8.22	6.28	8.00	2.95	9.37	6.56
	All Ss	6.93	4.03	8.82	5.38	7.46	4.24	8.48	6.58
Total	M	48.98	41.07	61.07	40.14	61.67	49.40	66.67	44.68
	F	58.40	31.05	52.41	46.52	56.87	44.67	70.27	46.02
	All Ss	54.78	34.26	57.46	43.06	59.49	47.41	68.77	45.51

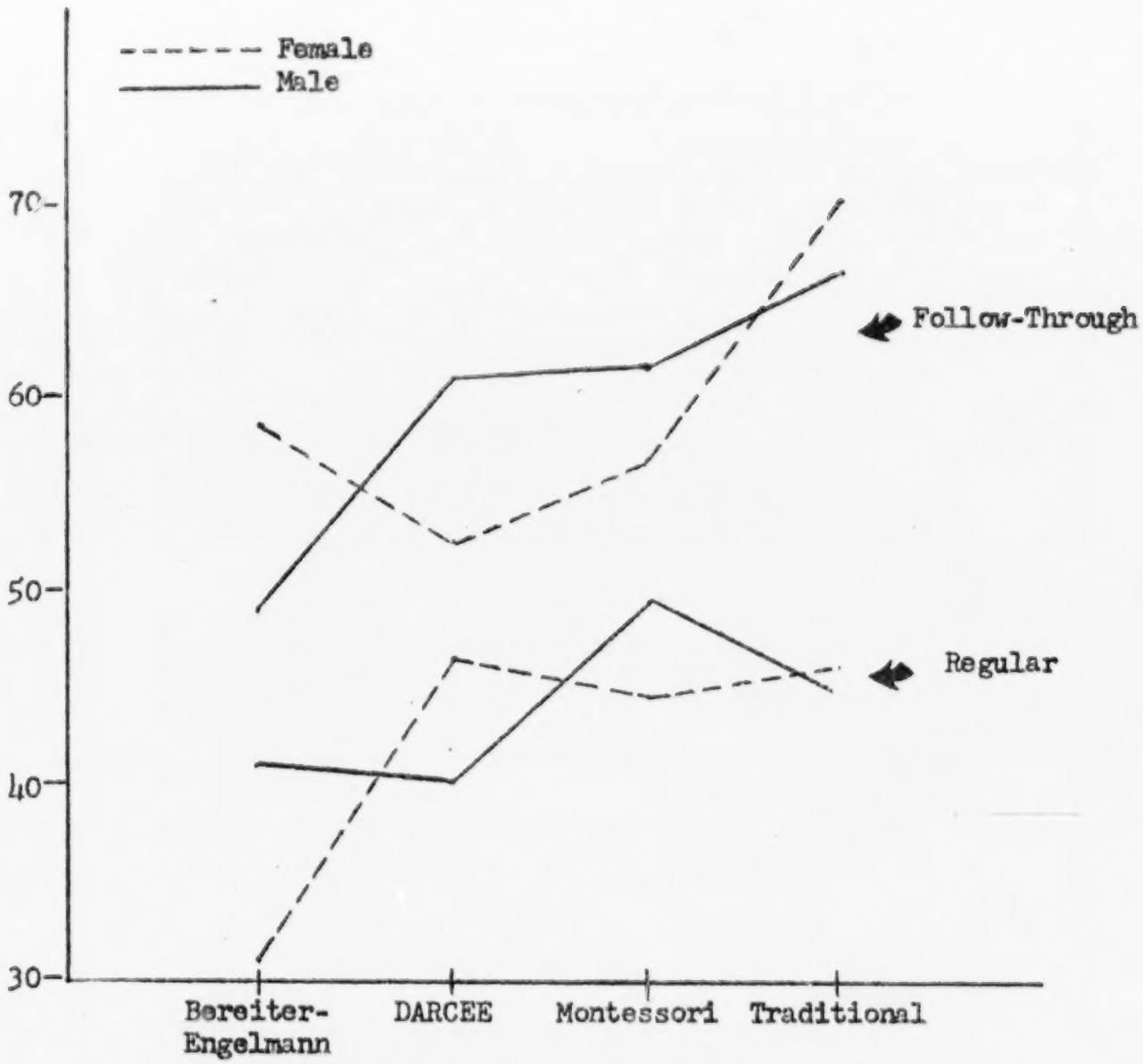


Fig. 1. Adjusted means on Metropolitan Readiness Total Score by Sex, Head Start, and Kindergarten.

Head Start-by-Kindergarten Interactions

The covariance analysis produced only two interactions of Head Start-by-Kindergarten - these occurred on Word Meaning and on Listening and were very similar. Both of the interactions involved a contrast between Montessori and the other three programs in that Montessori was higher in Regular Kindergarten. These interactions cannot be interpreted since it is impossible to determine whether the effect is due to Kindergarten teacher or to Kindergarten program.

Head Start Program Effects

It is evident from a comparison of Table 1 (adjusted means) and Table 2 (unadjusted means) that the order for Head Start programs was the same in both Regular and Follow-Through Kindergartens on three Readiness sub-tests: Word Meaning, Listening and Copying. From the covariance analysis significant Head Start main effects were found on these three tests: on Word Meaning, Bereiter-Engelmann children were low compared to other programs; on Listening and Copying, Traditional children were high and Bereiter-Engelmann children low and the difference was significant. These results are shown graphically in Figure 2.

II. Analysis of Variance - Controls

Since Preschool Inventory scores were not available for the controls who entered Follow-Through, a separate analysis was made comparing Follow-Through and Regular Kindergarten children who had not had any Head Start. There were 13 controls in Follow-Through and 22 in Regular Kindergarten, a total of 35.

Follow-Through vs. Regular Kindergarten

Results on the total test score indicated Follow-Through superiority and this was also the case on three sub-tests: Matching, Alphabet and Copying. These results are shown in Table 3.

Sex Effects and Interactions

Although there was no main effect of sex from the covariance analysis, the comparison of Follow-Through and Regular controls did reveal such an effect in that females were higher over both Kindergartens on total score and also on the Listening, Numbers and Copying sub-tests. It can also be seen from Table 3 that all sub-test scores are greatly depressed in the Regular Kindergarten group of males. One Sex-by-Kindergarten interaction occurred on the Alphabet sub-test. Control females had better scores in Regular Kindergarten than males, whereas males were better than females in Follow-Through.

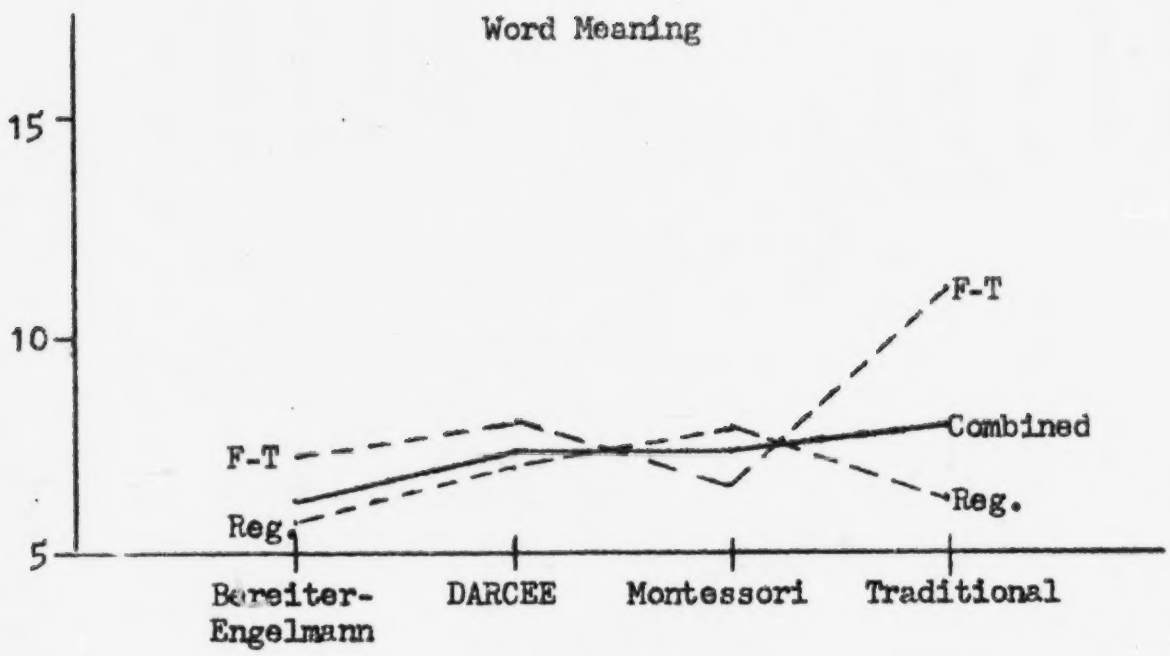
Although the sex main effect within the control group was overriding, and on the total score there was no interaction of sex-by-kindergarten program, the disastrous effect on males of failing to have Head Start and then entering a non-academic Kindergarten can be seen in Table 4. All experimental pre-kindergartens have been combined and the

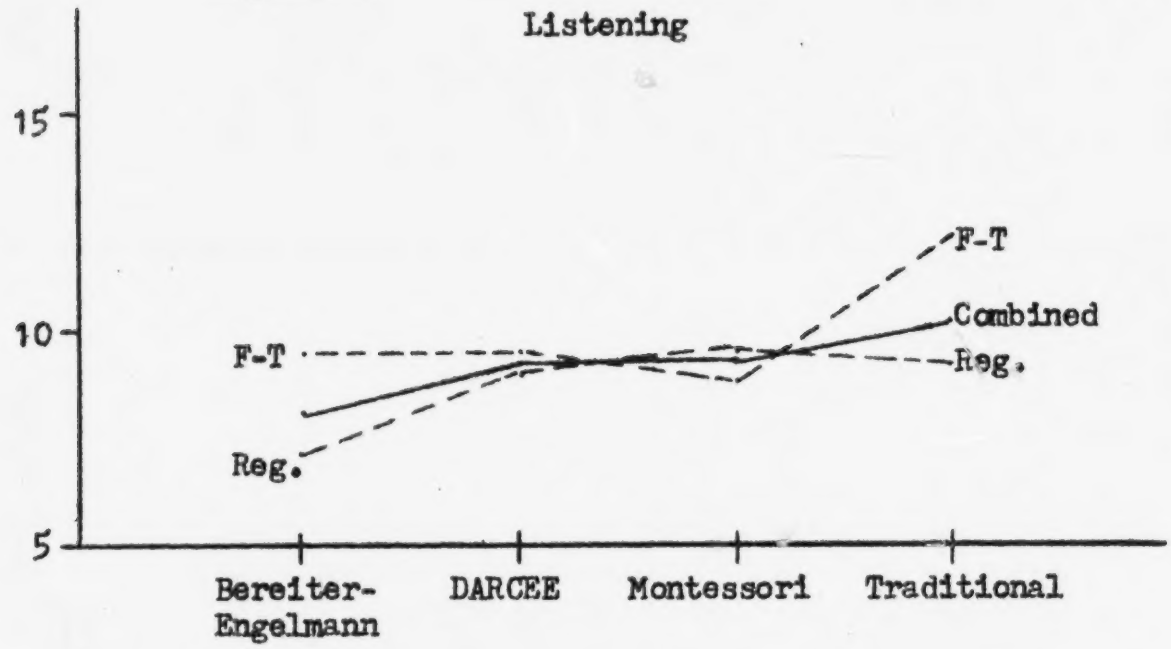
TABLE 2

Metropolitan Readiness Test Scores - Unadjusted Means

Follow-Through vs. Regular

		Bereiter-Engelmann		DARCEE		Montessori		Traditional	
		F-T	Reg.	F-T	Reg.	F-T	Reg.	F-T	Reg.
Word Meaning	M	8.19	6.12	8.42	6.57	6.66	8.08	10.39	6.00
	F	8.00	5.46	8.00	8.75	4.80	7.87	11.00	5.72
	All Ss	8.07	5.67	8.24	7.57	5.81	7.99	10.74	5.82
Listening	M	8.00	8.25	10.14	9.52	9.66	9.63	13.00	8.90
	F	11.50	6.70	9.00	9.68	6.79	9.12	11.71	8.72
	All Ss	10.15	7.19	9.66	9.59	8.36	9.42	12.24	8.79
Matching	M	10.39	3.62	8.71	4.89	9.33	5.63	9.79	5.81
	F	9.75	4.23	9.39	7.31	4.39	4.62	8.00	5.16
	All Ss	9.99	4.03	8.99	5.99	7.09	5.21	8.75	5.41
Alphabet	M	11.39	5.00	9.85	4.94	13.50	8.90	13.39	7.18
	F	12.75	4.94	9.00	8.06	9.79	11.50	13.28	7.27
	All Ss	12.23	4.95	9.49	6.37	11.81	9.99	13.33	7.24
Numbers	M	10.39	8.50	14.00	8.68	14.00	12.00	13.79	9.72
	F	14.62	7.29	12.79	11.56	12.69	12.12	13.14	8.00
	All Ss	12.99	7.67	13.49	9.99	13.45	12.05	13.41	8.65
Copying	M	7.79	3.75	9.14	4.47	6.83	5.18	7.39	6.54
	F	8.00	4.00	9.00	7.18	6.19	3.62	8.71	5.72
	All Ss	7.92	3.92	9.08	5.71	6.54	4.52	8.16	6.03
Total	M	56.19	35.25	60.28	39.10	60.50	49.45	**67.80**	44.18
	F	64.62	32.64	57.59	52.56	44.79	49.12	**65.85**	40.38
	All Ss	61.38	33.47	59.16	45.25	53.36	49.31	66.66	41.82
∞ Difference F-T - Reg.		27.91		13.91		4.05		24.84	





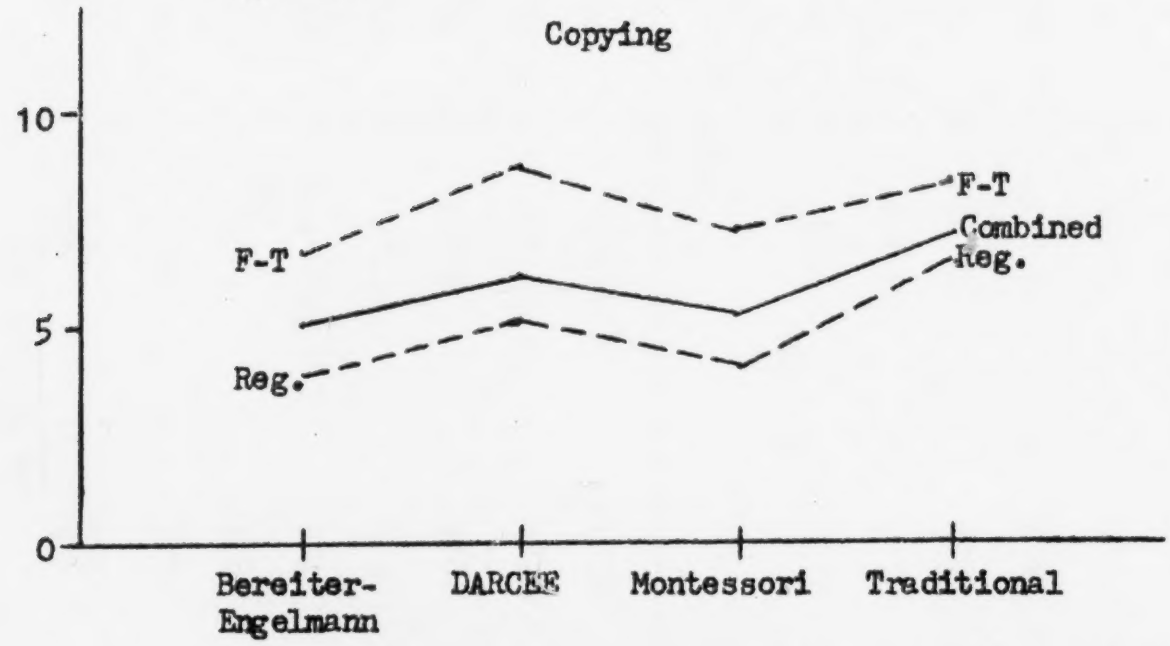


Fig. 2. Adjusted means on Metropolitan Readiness sub-tests by Head Start and Kindergarten Programs.

TABLE 3

Metropolitan Readiness Test Scores

For Children Without Previous Head Start

	Control Males		Control Females		All Control Ss	
	F-T N=9	Reg. N=10	F-T N=4	Reg. N=12	F-T N=13	Reg. N=22
Word Meaning	7.78	5.90	9.00	7.00	7.46	3.91
Listening	11.00	7.00	11.00	10.50	13.23	10.59
Matching	8.67	4.00	9.00	5.55	13.62⊛	4.77
Alphabet	14.44	2.90	11.75	7.17	8.77⊛	4.82
Numbers	13.00	7.70	13.75	13.00	11.08	8.91
Copying	6.17	2.10	8.75	6.17	8.15⊛	6.50
Total	61.89	29.60	63.25	49.33	62.30⊛	40.36

Unadjusted Scores for Children With Previous Head Start

	Males		Females		All Ss	
Word Meaning	8.34	6.71	8.19	6.76	8.27	6.74
Listening	10.17	9.20	10.00	8.45	10.14	8.79
Matching	9.47	5.06	8.11	5.40	8.77	5.24
Alphabet	11.91	6.34	11.55	7.38	11.72	6.91
Numbers	13.17	9.63	13.47	9.32	13.33	9.46
Copying	7.86	4.97	8.03	5.33	7.95	5.17
Total	61.08	41.93	59.59	42.64	60.31	42.32

⊛ Sig. high (p=<.05)

TABLE 4

Metropolitan Readiness Test Scores

For Groups With Different Combinations of Head Start and Kindergarten

	No Head Start Regular Kindergarten		No Head Start Follow-Through		Head Start Regular Kindergarten		Head Start Follow-Through	
	M	F	M	F	M	F	M	F
Adjusted	-	-	-	-	43.39	41.66	59.82	60.22
Unadjusted	29.60	49.33	61.89	63.25	41.92	42.64	61.08	59.59

four columns represent various combinations of no Head Start or Head Start with either Follow-Through or Regular Kindergarten. Males who had no Head Start and who went into Regular Kindergarten are outstandingly low on Readiness.

III. Matched Classes Analysis of Variance

An analysis of variance of unadjusted Readiness scores for the purpose of assessing variables (10) and (11), involving combined effects of Head Start and Kindergarten, would have been satisfactory if there had been no pre-kindergarten area main effect on the PSI and no Area-by-Head Start interaction. Unfortunately, although there was no area main effect, there was an Area-by-Head Start interaction. This interaction indicated that the four classes which entered Follow-Through did not represent the same relative standing within each Head Start program on the PSI. That is, the Bereiter-Engelmann class which went into Follow-Through was the highest of the four Bereiter-Engelmann classes on the PSI, the DARCEE class was the second highest DARCEE class, and the Traditional class was the third from the highest class. The relative standing of these classes within programs was the same on the Stanford-Binet as on the PSI.

The strategy finally selected was as follows: Each class in Follow-Through was matched with a class from the same Head Start program in Regular Kindergarten whose mean and standard deviation on the Preschool Inventory at the end of Head Start was closest to the mean of the Follow-Through class. Matching on the PSI also had the effect of matching on the Stanford-Binet. Montessori was omitted for reasons already explained. Readiness scores were analyzed in a design in which Kindergarten program was nested within Head Start programs. Assuming that within each Head Start program children started Kindergarten at similar levels on Readiness, the results obtained from this analysis could be tentatively interpreted in terms of the effects on Readiness of various combinations of the three Head Start programs and the two types of Kindergarten. To the extent that pre-kindergarten PSI means differed among Head Start programs after classes within programs were matched, the main effect of Kindergarten program within each Head Start program would also include the interaction of Kindergarten program with pre-kindergarten level on Readiness. These effects are of considerable interest, both practically and theoretically. They are, however, limited in generality because of the possible influence of unmeasured Head Start teacher effects (which in any approach remain confounded with Head Start program) and because only one level of Head Start success is represented for each Head Start program. There were 59 Ss included in this analysis.

Head Start/Kindergarten Program Combinations

Means and standard deviations on pre-kindergarten PSI and Kindergarten Readiness for the matched classes are shown in Table 5. PSI means for the DARCEE and Bereiter-Engelmann classes were quite similar. The Traditional mean was much lower. Readiness means in Follow-Through are similar for all three programs.

TABLE 5

Metropolitan Readiness Means and Standard Deviations* in Follow-Through and Regular Kindergarten: Classes Matched on Post-Head Start Preschool Inventory

	Follow-Through			
	Post-HS-PSI	Metropolitan Readiness	Post-HS-PSI	Metropolitan Readiness
Bereiter-Engelmann	44.33 (5.35)	59.42 (14.54)	42.00 (9.69)	27.22 (12.03)
DARCEE	41.66 (6.22)	59.56 (11.62)	43.38 (6.99)	51.69 (17.18)
Traditional	36.10 (10.55)	67.40 (7.99)	35.36 (9.45)	50.36 (12.99)

*Standard Deviation in parenthesis.

The analysis revealed no differences between Follow-Through and Regular Kindergarten in the DARCEE program on total or on any sub-test. Within Traditional, significant Kindergarten effects were found on total, Word Meaning, and Alphabet in favor of Follow-Through. For Bereiter-Engelmann, every sub-test comparison as well as total score produced very significant differences between Follow-Through and Regular. This is shown graphically in Figure 3.

IV. Analysis of Variance of Head Start and Kindergarten

The appropriate analysis for determining the main effect of Head Start with Kindergarten effect removed was an analysis which included both variables, without adjustment for pre-kindergarten level. However, inspection of Table 6 which presents weighted means for all groups, indicated that no new information was likely to be obtained by such an analysis. Therefore, it was not performed.

V. Analysis of Original Subjects - Kindergartens Combined

Scores of a few of the original group of children had to be eliminated for various reasons in making the analyses by Kindergarten vs. Head Start. For example, one entire class of Bereiter-Engelmann children continued with the same teacher in the Bereiter-Engelmann program through Kindergarten. Some children who had the experimental Head Start programs did not attend Kindergarten at all. A few entered parochial schools or moved into the county school system.

In order to obtain information on the Readiness scores of the original sample, an analysis of variance was done by Head Start programs and sex without the Kindergarten variable. This analysis did not provide any new information, but simply indicated that Bereiter-Engelmann and Controls were low, as might be expected from their performance in Regular Kindergarten, since there were a larger number of experimental subjects in Regular than in Follow-Through, and all of the original controls entered Regular if they had Kindergarten at all. Total N was 195. Means are shown in Table 7.

VI. Correlations Between Readiness and Main Battery

Product-moment correlations were computed between each sub-test and total Readiness and the five "cognitive" tests in the main battery given to all Kindergarten children at the end of the year. This matrix is shown in Table 8. As might be expected, most of these correlations are substantial, and all are statistically significant. The highest correlation among Readiness sub-tests is that between Alphabet and Numbers, as is the case for the standardization sample reported in the manual. The correlation between Readiness Total and Stanford-Binet, however, is considerably smaller in this sample than that reported in the manual (.34 compared with .67). It is possible that this discrepancy reflects a difference between the distribution of Binet scores in the experimental sample and in the larger sample used in standardization.

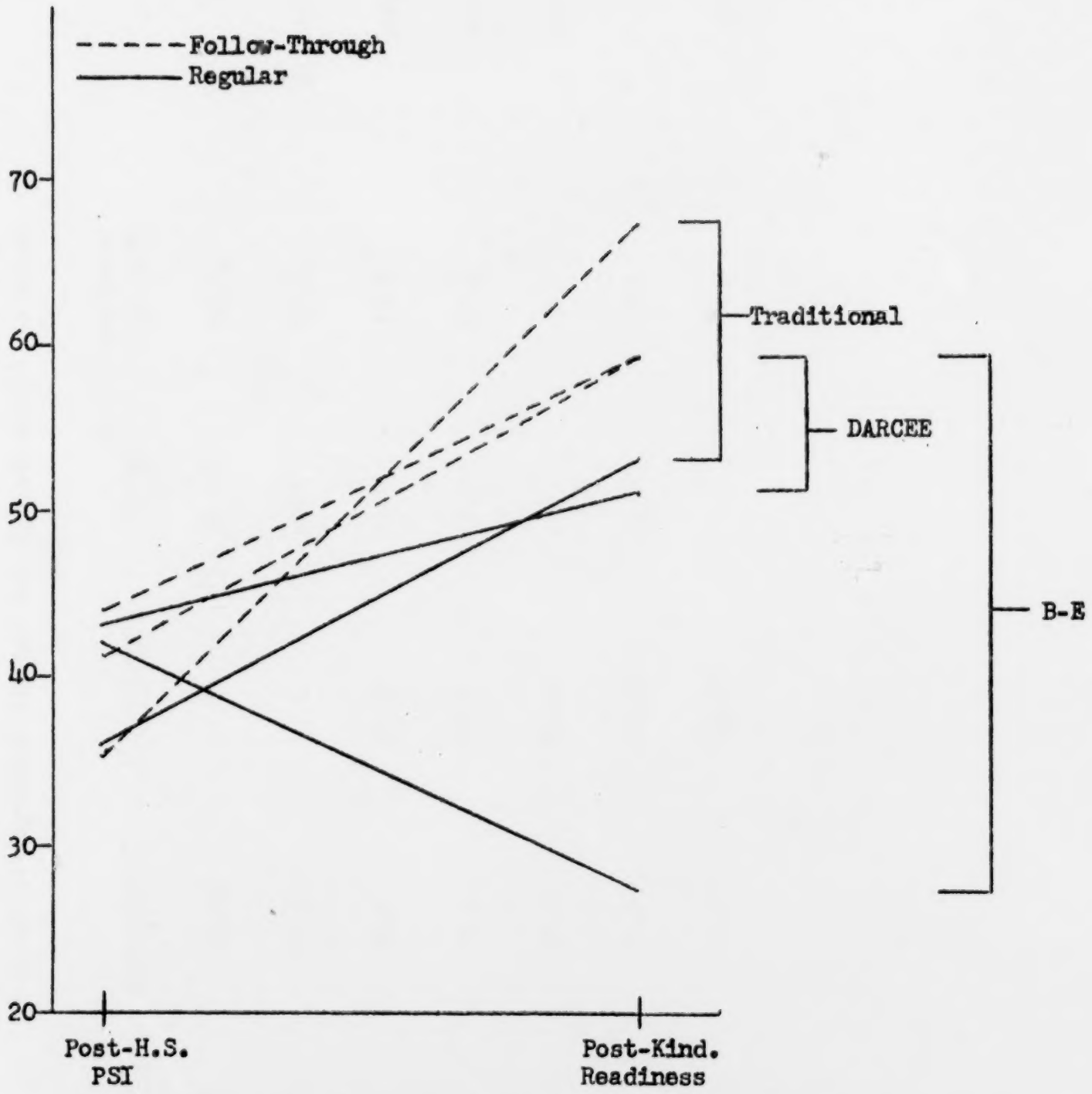


Fig. 3. Differential effects of Head Start/Kindergarten combinations on Metropolitan Readiness Test. (Classes matched within Bereiter-Engelmann, DARCEE, and Traditional Head Start programs on Preschool Inventory.)

TABLE 6

Means on Follow-Through and Regular Kindergarten Subjects

	Bereiter-Engelmann	DARCEE	Montessori	Traditional	Controls
Total	43.02	48.80	50.79	49.09	48.51
Word Meaning	6.49	7.74	7.19	7.26	7.11
Listening	8.21	9.61	9.03	9.80	9.72
Matching	6.76	6.07	5.89	6.38	6.29
Alphabet	7.16	7.44	10.66	9.02	8.06
Numbers	9.49	10.89	12.56	10.04	11.57
Copying	5.28	6.57	5.26	6.05	5.22

TABLE 7

Means on Metropolitan Readiness Test

Original Subjects: Follow-Through Plus Regular Plus Others

		Bereiter-Engelmann	DARCEE	Montessori	Traditional	Controls
Word Meaning	M	6.10	7.31	7.59	7.38	6.54
	F	6.00	8.09	6.69	7.12	6.20
	All Ss	6.04	7.65	7.20	7.21	6.36
Listening	M	8.29	9.55	9.65	10.19	7.46
	F	8.26	9.48	8.23	9.42	10.00
	All Ss	8.27	9.52	9.03	9.71	8.82
Matching	M	5.05	5.86	6.94	7.06	4.62
	F	6.13	7.30	4.54	5.96	5.20
	All Ss	5.69	6.50	5.90	6.38	4.93
Alphabet	M	6.43	6.21	10.53	9.13	3.69
	F	7.61	7.57	10.85	8.88	7.40
	All Ss	7.13	6.81	10.67	8.98	5.68
Numbers	M	8.43	10.62	12.71	11.00	8.46
	F	9.52	11.30	12.38	9.27	12.60
	All Ss	9.08	10.92	12.57	9.93	10.68
Copying	M	5.52	5.66	5.76	6.81	2.77
	F	5.65	7.35	4.62	6.63	6.00
	All Ss	5.60	6.40	5.27	6.69	4.50
Total	M	39.67	45.21	53.35	51.56	33.54
	F	43.16	51.17	47.46	47.12	47.40
	All Ss	41.75	47.85	50.80	48.81	40.96
Difference: F-M		+3.50	+5.97	-5.89	-4.45	+13.86

TABLE 8

Correlations Between Metropolitan Readiness Test and Other Cognitive Variables

	PSI Post	PSI K	S-B Pre	S-B Post	S-B K	PSP K	BCI* K	ARITH K	Metropolitan Readiness Test Wd.M.	List.	Match.	Alpha.	Nos.	Copy.	Total
PSI Pre	.79	.69	.59	.58	.49	.49	.65	.50	.45	.33	.51	.44	.52	.34	.58
Post		.76	.67	.63	.54	.52	.68	.52	.44	.28	.46	.43	.48	.37	.56
K			.63	.53	.69	.52	.76	.60	.37	.29	.52	.50	.52	.36	.58
S-B Pre				.68	.64	.53	.60	.40	.39	.28	.37	.31	.35	.22	.43
Post					.56	.42	.54	.30	.35	.23	.33	.28	.34	.16	.37
K						.43	.55	.38	.28	.18	.36	.30	.34	.21	.38
PSP K			.53	.30		.24	.19	.28	.29	.32	.14	.33			
BCI* K				.57		.34	.24	.45	.50	.46	.29	.52			
ARITH K						.30	.26	.46	.65	.51	.44	.62			
Wd.M.							.53	.46	.42	.50	.27	.67			
List.								.42	.44	.50	.26	.67			
Match.									.53	.53	.46	.76			
Alpha.										.67	.52	.84			
Nos.											.49	.85			
Copy.												.68			

Notes:

All correlations are significant at the $p < .05$ level. N=176 (Experimental subjects)

*Correlation signs have been reversed for consistency with other instruments.

Discussion

The beneficial effects of this particular Follow-Through Kindergarten, so far as the Metropolitan Readiness Test is concerned, can hardly be doubted. Moreover, this effect is not merely a statistically significant one but very meaningful in terms of the actual score differences. The manual for the Metropolitan describes a score range from 64-76 as "high-normal, good prospects for success in first-grade work", the range 45-63 as "average, likely to succeed in first-grade work", and the range 24-44 as "low-normal, likely to have difficulty in first-grade work".

Children who had the benefit of the Follow-Through Kindergarten did relatively well on Readiness, scoring near the top of the "average" category regardless of whether they had previous Head Start experience. Children who had Regular Kindergarten scored near the top of the "low-normal" category.

The Follow-Through Kindergarten seemed to be especially important in the case of males who had not had Head Start. The little boys who entered Regular Kindergarten with no previous school experience had a mean of only 29.60 on the total Readiness which is near the bottom of the "low-normal" category, and some are classified "low - chances of difficulty high". Their counterparts who entered Follow-Through did as well as those who had spent a year in Head Start. There is no reason to assume that the two groups were different prior to Kindergarten, but in any case the area in which Follow-Through was located, and from which controls came into Follow-Through, is the most deprived area by other criteria. The two groups did not differ at the end of Kindergarten on Binet IQ or the PSI.

It is possible, of course, that different testing conditions existed in the two Kindergartens. Follow-Through classes did have the benefit of aides and other adults who could help the teacher with group testing. Teachers' motivations may have been higher also, since Follow-Through is experimental and was in a sense "on trial". For the same reason, however, Regular Kindergarten was under pressure. It seems unlikely, in any case, that such large and consistent main effects as well as first- and second-order interactions could be attributed solely to different testing conditions, especially since there were seven Follow-Through teachers and 27 Regular Kindergarten Teachers involved.

There is some evidence that regardless of Kindergarten program, Bereiter-Engelmann children did poorly and Traditional children did well on portions of the Readiness Test. One possible explanation for this finding recommends itself, although data to support it are not available from this study. Educators would probably agree that teacher attention is typically directed most often toward those children whose level of achievement is lowest. If this was the case, attention would probably have been focused on Traditional and Control children, judging by pre-kindergarten levels on PSI. Although Kindergarten teachers were not told what Head Start program the children came from, indirect reports were received early in the year from the Kindergarten teachers in Follow-Through that they could identify the Bereiter-Engelmann children because

"they already know their (sound) blends".

Although neither of the two Kindergarten programs was oriented toward maximizing the effects of any particular experimental Head Start, the two Kindergartens did not interact with Head Start programs in the same way. Based on the matched classes analysis, for DARCEE children the two kinds of Kindergarten made no difference at all. They performed moderately well in both. For Traditional children there were some differences consisting of especially good performance in Follow-Through. For Bereiter-Engelmann children there were large and consistent differences in that their performance was very low in Regular Kindergarten. (This result is consistent with the slightly greater drop in Binet IQ for this group at the end of Kindergarten.) As Table 9 shows, there is about a 33-point discrepancy between the best sub-group - Traditional children in Follow-Through - and the poorest group - Bereiter-Engelmann children in Regular.

In short, if their Readiness scores are predictive of achievement in first grade, Regular Kindergarten was a disaster for Bereiter-Engelmann children. Table 9 shows that these children scored even lower than Controls who entered Regular Kindergarten without any Head Start at all.

There may be a number of explanations for the poor showing of children from Bereiter-Engelmann in Regular Kindergarten but there is no basis on which to choose among them. It would be easier to explain the poor results in Regular Kindergarten if the results in Follow-Through had been exceptionally good. But the Bereiter-Engelmann children in Follow-Through did not reach higher levels on Readiness than did those from other Head Start programs. It would seem that neither of these Kindergarten programs provided a really good continuation for children from Bereiter-Engelmann Head Start. Possibly the fact of having spent the pre-kindergarten year in a fast-paced program which features group drill and friendly competition did handicap these children in adjusting to either the more leisurely pace of Regular Kindergarten or the individual effort required in Follow-Through.

The fact that children from Traditional Head Start in Follow-Through Kindergarten had the highest scores on Readiness is of great interest, (even though they were not much higher than Controls), because these children started Kindergarten with a lower mean on the PSI than the Bereiter-Engelmann and DARCEE groups did. Thus their performance represents greater gains, if the PSI scores were indicative of their Readiness level. One way of interpreting these results is to hypothesize a limited scope in curriculum materials and instruction, within which children from more academic pre-kindergartens had little room for improvement, while those who had not learned so much in pre-kindergarten were able to progress to the level of their more advanced counterparts. Weighing against this idea is the fact that Follow-Through is intended as an individualized program, and video-tape data confirm that it was implemented in this way. Thus it was in principle possible for each child to progress at his own rate.

TABLE 9

Ordered Means on Head Start/Kindergarten Combinations

Metropolitan Readiness Test - Total Score

Traditional/Follow-Through	66.66
Controls/Follow-Through	62.30
Bereiter-Engelmann/Follow-Through	61.38
DARCEE/Follow-Through	59.16
Montessori/Follow-Through	53.36
Montessori/Regular	49.31
DARCEE/Regular	45.25
Traditional/Regular	[illegible]
Controls/Regular	[illegible]
Bereiter-Engelmann/Regular	33.47

Whatever the reasons, these different results from various Head Start and Kindergarten programs may have some meaning in terms of the effects of various sequences of educati al experiences on the rate of acceleration in preschool. Sigel and Olmsted (1971) have shown that the same two kinds of training given in different orders can have very different effects on preschool children.

The Sex-by-Head Start/Kindergarten interactions obtained from the covariance analysis are particularly interesting. They suggest that the residual effects of the different Head Start programs combined with the two Kindergartens may have had different effects in males and females. Since females were generally superior over all programs, and results for females are less consistent than those for males, perhaps program planners should focus on the best Head Start/Kindergarten combination for boys.

The data from the present study do not permit any generalization in this respect because when Head Start/Follow-Through combinations are subdivided on the basis of sex, the N's are very small. However, over both Kindergartens, the difference between males and females (plotted in Figure 4) suggests that males fared better after Montessori or Traditional pre-kindergarten than after DARCEE or Bereiter-Engelmann. The difference is rather small, though, and the interaction of Head Start with sex was not significant. Thus, even speculation in this direction should be made cautiously.

Five tentative conclusions may be offered at this point regarding Readiness: (1) The token-economy Follow-Through Kindergarten was better for these children than the Regular Kindergarten offered in this City; (2) The best combination of Head Start and Kindergarten was Traditional Head Start followed by Follow-Through Kindergarten; (3) The worst combination was Bereiter-Engelmann Head Start followed by Regular Kindergarten; (4) For children entering this Follow-Through program in Kindergarten there is no evidence that there was an advantage in having had Head Start at all; and (5) For males entering the Regular Kindergarten program, any type of Head Start appeared to be better than none.

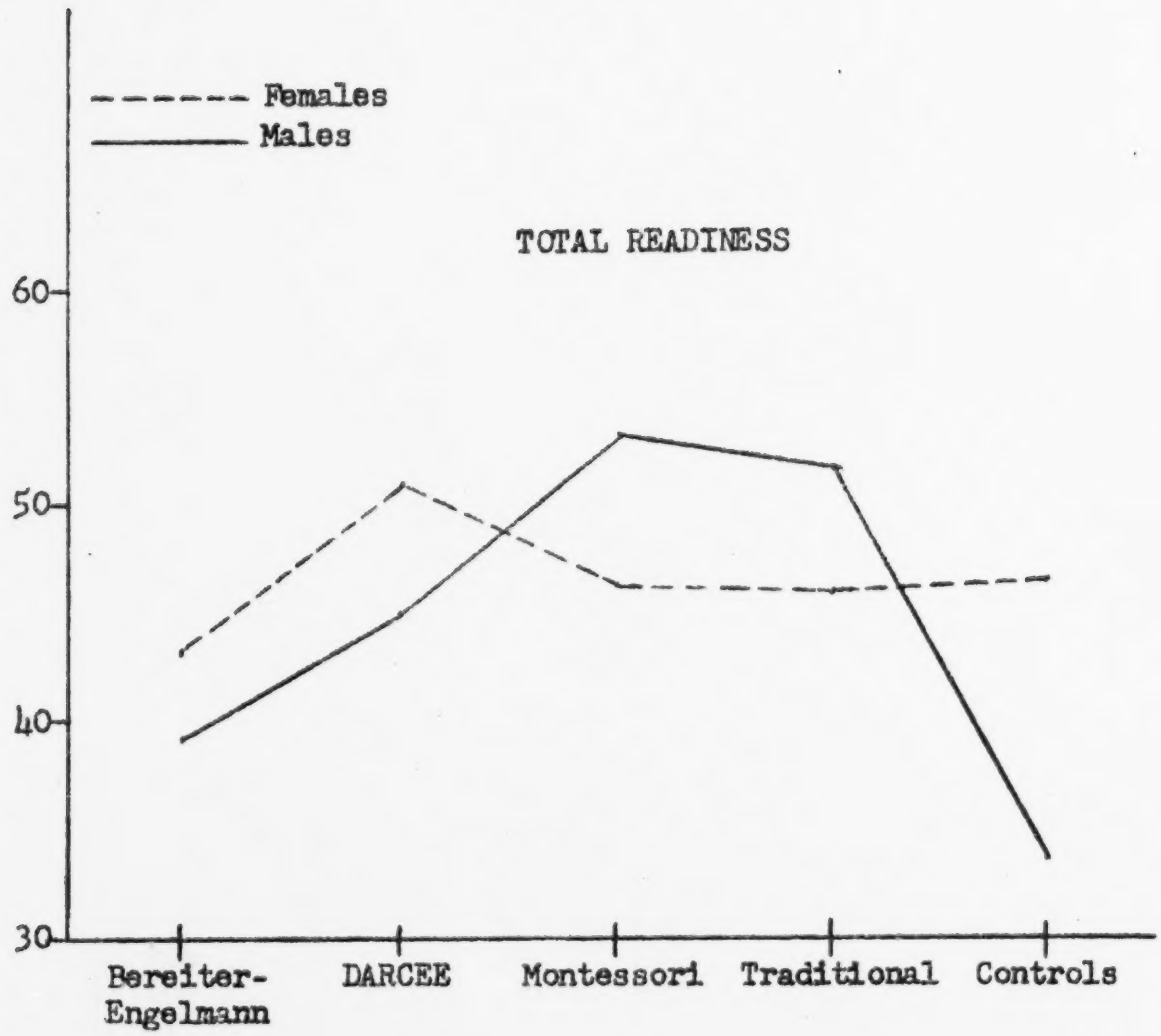


Fig. 4. Unadjusted means on Metropolitan Readiness Total Score for original sample.

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